

## Scientific Note

### PRELIMINARY INSECT SURVEY ON WESTERN POISON OAK (*TOXICODENDRON DIVERSILOBUM* (TORREY & GRAY)), COYOTE BRUSH (*BACCHARIS PILULARIS* DE CONDOLLE), AND TOYON (*HETEROMELES ARBUTIFOLIA* (LINDLEY)) IN THE SANTA CRUZ MOUNTAINS, CALIFORNIA

Chaparral represents one of the most widespread and unique vegetation types in California, covering roughly 9% of the state (Holland, V. L. & D. J. Keil, 1995, California vegetation. Kendall/Hunt Publishing, Dubuque, Iowa), yet little documentation exists on the diversity of insects found within this community. Agricultural and urban expansion, grazing, fire suppression, and the introduction of exotic plants all threaten chaparral habitat. Over a one year period beginning June 1995, we examined the insect fauna present on three commonly encountered shrubs within a chaparral community: western poison oak (*Toxicodendron diversilobum* (Torrey & Gray)), coyote brush (*Baccharis pilularis* De Condolle), and toyon (*Heteromeles arbutifolia* (Lindley)). Our objective was to develop a preliminary inventory of the insect fauna for the chaparral community in the central region of California and forms the basis of this scientific note.

Sampling was done in the Santa Cruz Mountains in portions of Santa Clara, Santa Cruz, and San Mateo counties in Northern California. Locations were randomly selected and used in this study if the three shrub species were present in quantities sufficient for sampling within a range of approximately 1 km. Nine new locations were sampled for each period. There were eight sampling periods throughout the year with five weeks between the start of periods except for two ten-week intervals during the winter. All sampling was done during the day in dry weather.

At each location, beating samples were taken from each species of shrub, from ten healthy branches of each species. The ten branches were selected to give a fairly uniform distribution across the patch of shrubs within the sampling location; branches close to other plant species were avoided. Branches were beaten with a length of broomstick over a 0.5 m<sup>2</sup> linen beating tray-funnel and dislodged material collected in a large jar. Samples were kept in plastic bags and frozen before sorting arthropods from debris.

Several resources were used for specimen identification, including specialists, identification keys, and by comparison with specimens in the collections at the California Academy of Sciences and San Jose State University. Due to lack of resources and time, identification efforts concentrated on the most common species, leaving many species undetermined. Undetermined species were separated by morphology. Voucher specimens have been deposited at the J. Gordon Edwards Museum at San Jose State University. A listing of the 826 insect species collected can be found in Appendix 1.

*Acknowledgments*—We thank the following people for their invaluable help

with identifications: John Brown (Tortricidae), Douglass R. Miller (Psyllidae, Triozidae, Coccidae), Gary L. Miller (Aphididae), David A. Nickle (Orthoptera), and Thomas J. Henry (Miridae) (all with the Systematic Entomology Laboratory, Agricultural Research Service, U.S. Department of Agriculture); J. Gordon Edwards (San Jose State Univ.) (Chrysomelidae), Phil Ward (U.C. Davis) (Formicidae), Norman Penny (California Academy of Sciences) (adult Neuroptera), Richard Snider (Michigan State Univ.) (*Bourletiella*), and Catherine A. Tauber (Cornell Univ.) (immature Neuroptera). We also thank The Midpeninsula Regional Open Space Preserve and several private landowners for allowing us to sample on their property.

Mark Isaak and Jeffrey Y. Honda, *Department of Biological Sciences, San Jose State University. One Washington Square, San Jose, California 95192.*

*Received 20 February 2002; Accepted 13 November 2002.*

Appendix 1. Number of insect specimens collected from coyote brush (C), poison oak (P), and toyon (T) over a 1 year period. Unless specified otherwise, Lepidoptera and Neuroptera are larvae and insects in other orders are adults.

Order Family	Species	C	P	T
<b>Collembola</b>				
Hypogastruidae	undet. sp. 1	4	0	4
	undet. sp. 2	2	0	0
Isotomidae	undet. sp. 1	0	2	0
	undet. sp. 2	0	0	1
	undet. sp. 3	3	2	2
	undet. sp. 4	0	0	1
	undet. sp. 5	0	1	0
	undet. sp. 6	0	0	1
Entomobryidae	<i>Entomobrya atrocincta</i> Schött	16	2	6
	<i>Entomobrya multifasciata</i> (Tullberg)	447	32	35
	<i>Entomobrya suzannae</i> Schött	11	16	46
	undet. sp. 1	4	0	8
	undet. sp. 2	1	0	0
	undet. sp. 3	0	0	4
	undet. sp. 4	0	1	1
Sminthuridae	<i>Bourletiella</i> n. sp. 1	61	153	9
	<i>Bourletiella</i> n. sp. 2	489	364	277
	<i>Bourletiella</i> sp. 3	0	62	0
	<i>Dicyrtoma beta</i> Christiansen & Bellinger	179	68	192
	<i>Sminthurus</i> sp.	1	0	1
<b>Microcoryphia</b>				
Machilidae	undet. sp. 1	1	0	0
	undet. sp. 2	0	1	0
<b>Thysanura</b>				
Lepismatidae	undet. sp.	1	0	0
<b>Ephemeroptera</b>				
Undetermined	undet. sp. 1	0	1	0
	undet. sp. 2	0	0	1

## Appendix 1. Continued.

Order Family	Species	C	P	T
<b>Phasmida</b>				
Timemidae	<i>Timema californica</i> Scudder	20	1	115
<b>Orthoptera</b>				
Acrididae	undet. sp. 1	1	0	0
	undet. sp. 2	1	0	0
Tettigoniidae	<i>Microcentrum</i> sp.	2	2	2
	undet. sp. 2	0	1	0
	undet. sp. 3	0	1	0
	undet. sp. 4	0	0	1
Rhaphidophoridae	<i>Gammarotettix bilobatus</i> Thomas	20	6	12
Gryllidae	<i>Hoplosphyrum</i> sp.	2	0	1
	<i>Oecanthus californicus</i> Saussure	1	9	8
	undet. sp. 3	1	1	0
<b>Dermaptera</b>				
Forficulidae	<i>Forficula auricularia</i> L.	5	2	8
<b>Plecoptera</b>				
Undetermined	undet. sp. 1	1	0	4
	undet. sp. 2	0	0	2
	undet. sp. 3	0	0	1
<b>Psocoptera</b>				
Trogiidae	<i>Cerobasis guestfalica</i> (Kolbe)	29	14	21
Liposcelididae	<i>Liposcelis</i> sp.	2	0	1
Caeciliidae	<i>Caecilius burmeisteri</i> Brauer	3	0	4
	<i>Caecilius maritimus</i> Mockford	5	14	42
	<i>Caecilius</i> sp. 3	1	1	1
	<i>Caecilius</i> sp. 4	5	0	0
	undet. sp. 5	0	0	1
Amphipsocidae	<i>Polypsocus corruptus</i> (Hagen)	0	1	4
Dasydemellidae	<i>Teliapsocus conterminus</i> (Walsh)	2	0	1
Stenopsocidae	<i>Graphopsocus cruciatus</i> (L.)	30	52	167
Elipsocidae	<i>Elipsocus hyalinus</i> (Stephens)	4	5	4
Philotarsidae	<i>Philotarsus picicornis</i> (Fabricius)	1	6	2
Lachesillidae	<i>Lachesilla pacifica</i> Chapman	5	2	17
Peripsocidae	<i>Peripsocus subfasciatus</i> (Rambur)	1	0	0
Ectopsocidae	<i>Ectopsocus briggsi</i> McLachlan	87	75	396
	<i>Ectopsocus californicus</i> (Banks)	69	54	274
Trichopsocidae	<i>Trichopsocus acuminatus</i> Badonnel	18	27	108
Psocidae	<i>Amphigerontia bifasciata</i> (Latreille)	69	2	4
	<i>Indiopsocus</i> sp.	0	5	1
	<i>Loensia maculosa</i> (Banks)	23	1	1
	undet. sp. 4	0	0	9
Undetermined	undet. sp. 1	0	1	0
	undet. sp. 2	1	0	0
<b>Heteroptera</b>				
Tingidae	<i>Corythucha incurvata</i> Uhler	17	1	688
	undet. sp. 2	2	0	0
	undet. sp. 3	1	0	0
	undet. sp. 4	0	0	1
Miridae	<i>Engytatus</i> sp.	0	0	3
	<i>Irbisia</i> sp. 1	1	17	0

## Appendix 1. Continued.

Order Family	Species	C	P	T
	<i>Parthenicus brunneus</i> Van Duzee	423	0	1
	<i>Plagiognathus diversus cruralis</i> Van Duzee	0	58	0
	undet. sp. 1	80	1	7
	undet. sp. 2	0	0	23
	undet. sp. 3	31	7	34
	undet. sp. 4	227	0	1
	undet. sp. 5	5	6	21
	undet. sp. 6	1	6	13
	undet. sp. 7	2	9	71
	undet. sp. 8	3	5	68
	undet. sp. 9	3	3	0
	undet. sp. 11	0	0	4
	undet. sp. 12	0	1	0
	undet. sp. 13	17	0	0
	undet. sp. 14	0	1	0
	undet. sp. 15	5	0	0
	undet. sp. 16	1	0	0
	undet. sp. 17	1	0	0
	undet. sp. 18	0	1	1
	undet. sp. 19	1	0	0
Nabidae	undet. sp.	1	0	0
Anthocoridae	<i>Orius insidiosus</i> (Say)	22	0	3
	undet. sp. 2	0	0	6
	undet. sp. 3	1	0	0
Reduviidae	<i>Empicoris rubromaculatus</i> (Blackburn)	0	0	7
	undet. immature sp. 2	1	2	3
Berytidae	undet. sp.	1	1	0
Lygaeidae	<i>Nysius tenellus</i> Barber	85	0	2
	undet. sp. 2	1	1	2
	undet. sp. 3	2	0	1
	undet. sp. 4	1	0	0
	undet. sp. 5	1	0	0
Rhopalidae	<i>Leptocoris trivittatus</i> (Say)	1	17	1
Pentatomidae	undet. sp. 1	0	1	0
	undet. sp. 2	0	0	2
	undet. sp. 3	0	0	1
	undet. sp. 4	4	0	0
	undet. sp. 5	0	0	1
Homoptera				
Cicadidae	undet. sp.	3	0	0
Membracidae	<i>Philya californiensis</i> (Goding)	809	0	1
	<i>Stictocephala</i> sp.	2	0	0
	undet. sp. 3	0	0	3
	undet. sp. 4	0	0	1
	undet. sp. 5	2	0	3
Aphrophoridae	undet. sp. 1	3	1	2
Cercopidae	undet. sp. 1	15	2	11
	undet. sp. 2	18	3	34
	undet. sp. 3	0	1	0
	undet. sp. 4	0	2	0
	undet. sp. 5	1	0	0
	undet. sp. 6	0	1	0

## Appendix 1. Continued.

Order Family	Species	C	P	T
Cicadellidae	<i>Acroneura</i> sp.	0	13	0
	<i>Empoasca</i> sp. 1	759	4	6
	<i>Empoasca</i> sp. 2	134	1	3
	<i>Neocoelidiana obscura</i> (Baker)	8	0	6
	<i>Pagaronia tredecimpunctata</i> Ball	9	12	4
	<i>Stragania</i> sp.	7	0	0
	undet. sp. 7	8	0	0
	undet. sp. 8	1	0	0
	undet. sp. 9	1	0	0
	undet. sp. 10	1	0	0
	undet. sp. 11	3	0	0
	undet. sp. 12	1	0	0
	undet. sp. 13	1	3	0
	undet. sp. 14	1	0	0
	undet. sp. 15	1	0	0
	undet. sp. 16	1	0	0
	undet. sp. 17	0	1	0
	undet. sp. 18	0	0	1
	undet. sp. 19	1	0	0
	undet. sp. 20	0	0	3
	undet. sp. 21	1	0	1
	undet. sp. 22	1	0	0
	undet. sp. 23	1	0	0
	undet. sp. 24	0	2	0
	undet. sp. 25	0	1	0
	undet. sp. 26	1	1	2
	undet. sp. 27	1	0	0
	undet. sp. 28	1	0	0
	undet. sp. 29	2	1	0
	undet. sp. 30	2	0	1
	undet. sp. 31	2	0	0
	undet. sp. 32	0	0	1
	undet. sp. 33	0	1	0
	undet. sp. 34	1	0	0
	undet. sp. 35	0	0	2
	undet. sp. 36	2	0	0
	undet. sp. 37	0	2	1
	undet. sp. 38	0	0	1
	undet. sp. 39	0	0	1
	undet. sp. 40	1	0	1
	undet. sp. 41	3	3	2
	undet. sp. 42	1	0	6
Delphacidae	undet. sp.	3	0	0
Psyllidae	<i>Psylla</i> sp.	3	1	2
	undet. sp. 2	0	0	1
	undet. sp. 3	0	1	0
	undet. sp. 4	1	0	0
	undet. sp. 5	0	0	1
	undet. sp. 6	0	1	4
	undet. sp. 7	1	0	0
	undet. sp. 8	1	0	0
	undet. sp. 9	0	0	2

## Appendix 1. Continued.

Order Family	Species	C	P	T
Aleyrodidae	undet. sp. 1	12	9	7
	undet. sp. 2	6	9	0
	undet. sp. 3	5	0	7
	undet. sp. 4	0	0	1
	undet. sp. 5	1	0	2
	undet. sp. 6	0	0	2
	undet. sp. 7	1	0	0
	undet. sp. 8	2	1	1
Aphidae	<i>Aphis baccharicola</i> Hille Ris Lambers	1383	10	1
	<i>Aphis</i> sp. 3	5	1	5
	<i>Aphis</i> sp. 4	15	2	0
	<i>Aphis spiraecola</i> Patch	15	0	2
	<i>Brachycaudus helichrysi</i> Kaltenbach	252	5	10
	<i>Dactynotus</i> sp. 1	42	7	6
	<i>Dactynotus</i> sp. 2	68	4	2
	<i>Hyadaphis foeniculi</i> Passerini	31	7	46
	<i>Myzocallis agrifolicola</i> Richards	7	4	15
	<i>Myzus persicae</i> Sulzer	45	1	0
	<i>Ovatus</i> sp.	14	5	5
	<i>Tuberculatus</i> sp. 1	5	1	3
	<i>Tuberculatus</i> sp. 2	0	4	5
	undet. sp. 1	7	1	2
	undet. sp. 2	14	3	0
	undet. sp. 14	0	3	1
	undet. sp. 15	3	0	0
	undet. sp. 16	0	0	1
	undet. sp. 17	7	0	0
	undet. sp. 18	1	1	1
	undet. sp. 19	0	2	2
	undet. sp. 20	0	0	2
	undet. sp. 21	2	0	1
	undet. sp. 22	3	0	2
	undet. sp. 23	0	3	0
	undet. sp. 24	2	35	0
	undet. sp. 25	0	4	0
	undet. sp. 26	7	0	0
	undet. sp. 27	2	0	0
	undet. sp. 28	1	0	0
	undet. sp. 29	1	0	0
	undet. sp. 30	1	0	0
undet. sp. 31	0	0	1	
undet. sp. 32	3	0	0	
Coccidae	<i>Ceroplastes</i> sp.	4	0	0
Triozidae	<i>Calinda longistylus</i> Crawford	77	0	0
Undetermined	male undet. scale sp. 1	1	0	0
	male undet. scale sp. 2	0	0	1
	male undet. scale sp. 3	1	0	0
	male undet. scale sp. 4	0	2	0
	male undet. scale sp. 5	1	0	0
	undet. scale sp. 1	1	0	0
	undet. scale sp. 2	1	0	0
	undet. scale sp. 3	6	0	0
undet. scale sp. 4	1	1	0	

Appendix 1. Continued.

Order Family	Species	C	P	T
	undet. scale sp. 5	0	0	10
	undet. scale sp. 6	0	0	5
	undet. scale sp. 7	0	0	2
	undet. scale sp. 8	0	0	1
	undet. sp. 1	0	0	1
	undet. sp. 2	2	0	1
Thysanoptera				
Aeolothripidae	<i>Aeolothrips</i> sp. 1	60	3	39
	<i>Aeolothrips</i> sp. 2	1	0	0
	<i>Franklinothrips</i> sp.	1	0	1
	<i>Melanothrips</i> sp.	0	1	1
	undet. sp. 2	3	2	5
	undet. sp. 6	1	1	0
Thripidae	<i>Anaphothrips</i> sp.	4	5	0
	<i>Chirothrips</i> sp.	4	1	0
	<i>Frankliniella</i> sp. 1	1060	102	18,397
	<i>Frankliniella</i> sp. 2	15	137	17
	<i>Heliothrips haemorrhoidalis</i> (Bouché)	0	11	98
	undet. sp. 2	5	11	61
	undet. sp. 3	73	1105	15
	undet. sp. 4	3	26	7
	undet. sp. 5	24	6	47
	undet. sp. 6	3	3	11
	undet. sp. 7	22	0	1
	undet. sp. 8	0	1	0
	undet. sp. 9	0	0	2
Phlaeothripidae	<i>Leptothrips</i> sp.	362	71	184
	<i>Nesothrips</i> sp.	1	0	0
	undet. sp. 2	5	4	386
	undet. sp. 3	1	3	0
	undet. sp. 4	1	0	0
	undet. sp. 5	0	1	1
Undetermined	undet. sp. 1	0	0	1
	undet. sp. 2	0	0	1
Neuroptera				
Raphidiidae	<i>Agulla</i> sp.	1	1	1
Coniopterygidae	<i>Coniopteryx latipalpus</i> Meinander	0	1	3
	<i>Coniopteryx palpalpus</i> Meinander	3	1	0
	other adult <i>Coniopteryx</i> spp.	7	2	11
	larva <i>Coniopteryx</i> spp.	28	1	13
Hemerobiidae	<i>Hemerobius</i> sp. 1	17	5	12
	<i>Hemerobius</i> sp. 2	1	0	2
Chrysopidae	<i>Chrysoperla carnea</i> (Stephens)	26	17	20
	<i>Chrysoperla plorabunda</i> (Fitch)	0	0	1
	<i>Pseudomallada sierra</i> (Banks)	6	0	3
	chrysopid sp. 4	0	0	1
	chrysopid sp. 5	2	0	0
Coleopterera				
Leiodidae	<i>Agathidium rotundulum</i> Mannerheim	3	0	38
Scydmaenidae	undet. sp. 1	7	2	9
	undet. sp. 2	6	0	4
	undet. sp. 3	3	3	2

## Appendix 1. Continued.

Order Family	Species	C	P	T
Staphylinidae	<i>Pseudolesteva</i> sp.	0	28	0
	undet. sp. 2	0	2	0
	undet. sp. 3	0	0	2
	undet. sp. 4	1	0	0
	undet. sp. 5	0	0	1
	undet. sp. 6	0	0	1
	undet. sp. 7	1	0	0
Hydrophilidae	undet. sp.	1	0	1
Buprestidae	undet. sp. 1	2	0	0
Elateridae	<i>Limonius ornatulus</i> (LeConte)	0	5	6
	<i>Sericus silaceus</i> (Say)	1	10	0
	undet. sp. 3	0	0	1
	undet. sp. 4	0	10	0
	undet. sp. 5	1	0	0
	undet. sp. 6	1	0	0
	undet. sp. 7	1	0	0
	undet. sp. 8	0	0	1
	undet. sp. 9	0	0	1
	Cantharidae	<i>Cantharis</i> sp. 1	0	10
<i>Cantharis</i> sp. 2		3	1	1
<i>Malthinus</i> sp.		0	2	0
<i>Malthodes bicurvatus</i> Fall		5	7	5
<i>Podabrus pruniosus</i> LeConte		4	0	1
<i>Podabrus modulatus</i> Fall		6	0	3
undet. sp. 7		0	0	1
undet. sp. 8		1	1	0
Dermestidae	<i>Cryptorhopalum apicale</i> (Mannerheim)	3	16	6
	undet. sp. 2	1	0	0
Anobiidae	undet. sp. 1	0	0	1
	undet. sp. 2	1	0	0
	undet. sp. 3	5	0	0
	undet. sp. 4	2	0	0
	undet. sp. 5	0	1	0
	undet. sp. 6	1	0	1
	undet. sp. 7	1	0	0
	undet. sp. 8	0	1	0
	undet. sp. 9	0	0	1
Ptinidae	<i>Ptinus interruptus</i> LeConte	8	0	5
	undet. sp. 2	0	1	0
Cleridae	undet. sp. 3	3	0	1
	undet. sp. 1	0	2	1
	undet. sp. 2	0	0	1
	undet. sp. 3	1	1	0
Melyridae	undet. sp. 4	1	0	1
	<i>Collops vitattus</i> (Say)	0	2	2
	<i>Listrus canescens</i> (Mannerheim)	1	11	6
Coccinellidae	undet. sp. 1	4	4	5
	undet. sp. 2	1	1	9
	<i>Cephaloscymnus occidentalis</i> Horn	0	0	1
	<i>Chilocorus bipustulatus</i> (L.)	0	0	1
	<i>Chilocorus nr. orbis</i>	0	0	3
	<i>Coccinella californica</i> Mannerheim	3	1	1
	<i>Coccinella septempunctata</i> (L.)	1	0	1

## Appendix 1. Continued.

Order Family	Species	C	P	T
	<i>Coccinella trifasciata subversa</i> LeConte	5	1	1
	<i>Cycloneda polita</i> Casey	5	2	3
	<i>Hippodamia convergens</i> Guerin	4	0	1
	<i>Hyperaspis quadrioculatus</i> Motschulsky	4	0	3
	<i>Psyllobora vigintimaculata</i> Say	80	7	21
	<i>Scymnus (Pullus) calaveras</i> Casey	0	0	2
	<i>Scymnus (Pullus) pallens</i> LeConte	0	1	5
	<i>Scymnus (Pullus)</i> sp. 1	10	1	1
	<i>Scymnus (Pullus)</i> sp. 2	15	0	0
	<i>Scymnus (Pullus)</i> sp. 3	1	0	1
	<i>Scymnus (Pullus)</i> sp. 4	1	0	0
	<i>Scymnus (Pullus)</i> sp. 5	0	1	1
	<i>Scymnus (Scymnus) nebulosus</i> LeConte	1	0	0
	<i>Scymnus marginicollis</i> Mannerheim	1	0	0
	<i>Stethorus punctum picipes</i> Casey	1	2	0
	<i>Zagloba ornata</i> (Horn)	1	0	10
	undet. larva sp. 1	57	5	1
	undet. larva sp. 2	1	0	2
	undet. larva sp. 3	1	0	0
	undet. larva sp. 4	2	0	0
	undet. larva sp. 5	1	4	0
	undet. larva sp. 6	0	0	2
	undet. sp. 22	0	0	2
Corylophidae	undet. sp. 1	1	0	0
	undet. sp. 2	1	0	0
Byturidae	<i>Byturellus griseus</i> (Jayne)	4	3	6
Mordellidae	undet. sp. 1	0	1	0
	undet. sp. 2	0	0	2
	undet. sp. 3	1	0	2
	undet. sp. 4	0	0	1
	undet. sp. 5	1	0	2
	undet. sp. 6	0	0	12
	undet. sp. 7	0	0	1
Meloidae	undet. sp. 1	1	0	0
	undet. sp. 2	0	1	0
	undet. sp. 3	1	0	0
Anthicidae	<i>Anthicus nitidulus</i> LeConte	14	4	13
	undet. sp. 2	1	0	1
Cerambycidae	undet. larva sp. 1	0	1	0
	undet. sp. 1	0	0	1
	undet. sp. 2	0	0	1
Bruchidae	<i>Stator limbatus</i> (Horn)	10	3	1
	undet. sp. 2	3	0	0
	undet. sp. 3	1	0	0
	undet. sp. 4	0	0	2
	undet. sp. 5	0	0	1
Chrysomelidae	<i>Crepidodera</i> sp. 1	8	0	1
	<i>Cryptocephalus confluentus</i> White	3	0	0
	<i>Diabrotica undecimpunctata</i> Mannerheim	7	0	1
	<i>Diachus auratus</i> (Fabricius)	17	10	27
	<i>Epitrix hirtipennis</i> (Melsheimer)	0	68	2
	<i>Trirhabda flavolimbada</i> (Mannerheim) adult	14	0	0
	<i>Trirhabda flavolimbada</i> (Mannerheim) larva	71	0	0

## Appendix 1. Continued.

Order Family	Species	C	P	T
	undet. larva sp. 2	1	9	3
	undet. larva sp. 3	0	0	2
	undet. larva sp. 4	0	0	2
	undet. larva sp. 5	0	0	1
	undet. sp. 7	0	0	3
	undet. sp. 8	0	0	5
	undet. sp. 9	0	0	1
	undet. sp. 10	1	0	0
	undet. sp. 11	0	1	0
	undet. sp. 12	1	0	0
	undet. sp. 13	0	0	1
Brentidae	<i>Apion cribricolle</i> LeConte	11	0	9
Curculionidae	<i>Sibinia maculata</i> (LeConte)	5	1	1
	undet. sp. 2	0	0	7
	undet. sp. 3	1	0	1
	undet. sp. 4	0	0	1
	undet. sp. 5	0	1	0
	undet. sp. 6	0	0	1
	undet. sp. 7	1	0	0
	undet. sp. 8	0	0	1
	undet. sp. 9	0	0	1
	undet. sp. 10	0	0	3
Undetermined	undet. sp. 1	0	0	4
	undet. sp. 2	0	0	1
	undet. sp. 3	1	0	2
	undet. sp. 4	0	0	1
	undet. sp. 5	0	0	2
	undet. sp. 6	0	0	1
	undet. sp. 7	1	0	0
	undet. sp. 8	1	0	0
	undet. larva sp. 1	6	1	0
	undet. larva sp. 2	0	0	1
	undet. larva sp. 3	0	1	0
	undet. larva sp. 4	0	0	2
	undet. larva sp. 5	0	1	0
	undet. larva sp. 6	2	1	0
	undet. larva sp. 7	0	1	0
	undet. larva sp. 8	1	3	0
	undet. larva sp. 9	0	1	0
	undet. larva sp. 10	0	1	0
Diptera				
Tipulidae	undet. sp. 1	0	0	1
	undet. sp. 2	0	1	3
Mycetophilidae	undet. sp.	0	0	1
Sciaridae	<i>Lycoriella</i> sp.	2	0	2
	undet. sp. 2	0	0	5
	undet. sp. 3	3	0	1
	undet. sp. 4	1	2	0
	undet. sp. 5	0	2	0
	undet. sp. 6	0	0	1
	undet. sp. 7	1	0	0
	undet. sp. 8	1	0	0

Appendix 1. Continued.

Order Family	Species	C	P	T
Cecidomyiidae	<i>Contarinia</i> sp.	39	3	0
	<i>Cordylomyia</i> sp.	1	0	0
	Lestremiinae sp.	0	0	1
	<i>Polystepha</i> sp.	2	1	1
	<i>Porricondyla</i> sp.	1	2	8
	<i>Rhopalomyia californica</i> Felt	2	0	0
	undet. sp. 5	0	0	1
	undet. sp. 6	2	0	0
	undet. sp. 8	0	1	0
	undet. sp. 9	3	0	1
	undet. sp. 10	0	1	5
	undet. sp. 11	1	0	0
	undet. sp. 12	3	0	0
	undet. sp. 13	0	1	0
undet. sp. 14	0	0	1	
Scatopsidae	<i>Psectrosciara</i> sp.	0	0	2
Synneuridae	undet. sp.	1	0	0
Simuliidae	undet. sp. 1	0	0	1
	undet. sp. 2	1	0	0
Ceratopogonidae	undet. sp. 1	0	1	0
	undet. sp. 2	0	0	1
Chironomidae	<i>Orthocladius</i> sp.	28	3	6
	undet. sp. 2	7	3	3
	undet. sp. 3	17	1	34
	undet. sp. 4	0	0	1
	undet. sp. 5	0	0	1
	undet. sp. 6	1	0	0
	undet. sp. 7	1	2	0
	undet. sp. 8	0	1	0
	undet. sp. 9	1	0	0
	undet. sp. 10	1	0	0
	undet. sp. 11	2	0	1
	undet. sp. 12	1	0	0
	undet. sp. 13	1	0	0
Rhagionidae	undet. sp.	0	0	2
Empididae	undet. sp. 1	0	0	3
	undet. sp. 2	0	1	0
	undet. sp. 3	1	0	0
Dolichopodidae	undet. sp. 1	1	0	0
	undet. sp. 2	1	0	0
Phoridae	undet. sp. 1	1	0	0
	undet. sp. 2	0	0	1
	undet. sp. 3	1	0	0
Tephritidae	undet. sp. 1	1	0	0
	undet. sp. 2	2	0	0
Agromyzidae	undet. sp. 1	0	0	1
	undet. sp. 2	1	0	0
	undet. sp. 3	0	2	0
	undet. sp. 4	0	1	0
Asteiidae	undet. sp. 1	0	0	1
	undet. sp. 2	1	0	0
Lauxaniidae	undet. sp. 1	1	0	0
	undet. sp. 2	1	0	0

## Appendix 1. Continued.

Order Family	Species	C	P	T
Trixoscelididae	undet. sp.	1	0	0
Chyromyidae	undet. sp.	0	0	1
Drosophilidae	undet. sp.	1	0	0
Chloropidae	undet. sp. 1	0	1	0
	undet. sp. 2	2	0	0
Undetermined	undet. larva sp. 1	0	0	1
	undet. larva sp. 2	0	1	0
Lepidoptera				
Lyonetiidae	<i>Bucculatrix variabilis</i> Braun (adult)	87	0	3
	<i>Bucculatrix variabilis</i> Braun (larva)	2265	1	4
Coleophoridae	<i>Coleophora lynosyridella</i> Walsingham	59	0	0
	<i>Coleophora viscidiflorella</i> Walsingham	313	1	0
Cossidae	undet. sp. 1	0	3	1
Tortricidae	undet. sp. 1	0	1	5
	undet. sp. 2	0	0	3
Pterophoridae	undet. sp. 1	0	1	0
	undet. sp. 2	0	1	0
Pyralidae	Phycitinae sp.	0	0	4
	undet. sp. 1	4	1	0
	undet. sp. 2	0	2	4
Hesperiidae	undet. sp. 1	0	0	4
Lycaenidae	undet. sp. 1	0	0	1
	undet. sp. 2	0	0	1
Geometridae	<i>Dichorda illustraria</i> (Hulst)	0	3	0
	<i>Elpiste marcescaria</i> Gueneé	314	1	2
	<i>Eupithecia rotundopuncta</i> Packard	2	3	1
	<i>Nematocampa limbada</i> (Haworth)	0	1	0
	<i>Nemoria leptalea</i> Ferguson	0	0	3
	<i>Nemoria</i> sp. 2	0	0	1
	<i>Neocalcis californica</i> (Packard)	0	0	1
	<i>Prochoerodes truxaliata</i> Gueneé	8	0	0
	<i>Sabulodes aegrotata</i> (Gueneé)	7	9	11
	undet. sp. 1	0	4	1
	undet. sp. 2	1	0	6
	undet. sp. 3	46	8	8
	undet. sp. 4	4	0	0
	undet. sp. 5	2	0	0
	undet. sp. 6	3	0	0
	undet. sp. 7	1	0	0
	undet. sp. 8	3	0	1
	undet. sp. 9	3	0	0
	undet. sp. 10	1	0	0
	undet. sp. 11	0	4	0
	undet. sp. 12	0	1	0
	undet. sp. 13	0	1	0
	undet. sp. 14	0	1	0
	undet. sp. 15	0	1	0
	undet. sp. 16	0	1	0
	undet. sp. 17	0	0	2
	undet. sp. 18	0	0	2
	undet. sp. 19	0	0	1
	undet. sp. 20	0	0	1

Table 1. Continued.

Order Family	Species	C	P	T
	undet. sp. 21	0	0	2
	undet. sp. 22	0	0	1
Lymantriidae	<i>Orgyia leucostigma</i> (J. E. Smith)	0	0	1
	undet. sp. 2	1	0	1
Noctuidae	<i>Cosmia canescens</i> Behr.	0	0	1
Undetermined	undet. larva sp. 1	49	0	0
	undet. larva sp. 2	5	0	1
	undet. larva sp. 3	2	0	0
	undet. larva sp. 4	1	0	0
	undet. larva sp. 5	1	0	0
	undet. larva sp. 6	1	0	1
	undet. larva sp. 7	1	0	0
	undet. larva sp. 8	1	0	0
	undet. larva sp. 9	0	1	0
	undet. larva sp. 10	0	3	0
	undet. larva sp. 11	0	2	1
	undet. larva sp. 12	0	1	0
	undet. larva sp. 13	0	1	0
	undet. larva sp. 14	0	0	1
	undet. larva sp. 15	0	0	1
	undet. larva sp. 16	1	1	2
	undet. larva sp. 17	2	1	3
	undet. larva sp. 18	0	0	2
	undet. larva sp. 19	0	0	1
	undet. larva sp. 20	0	0	1
	undet. larva sp. 21	0	0	2
	undet. larva sp. 22	0	0	1
	undet. larva sp. 23	1	0	1
	undet. larva sp. 24	0	0	1
	undet. larva sp. 25	1	0	1
	undet. larva sp. 26	0	0	1
	undet. larva sp. 27	0	0	1
	undet. larva sp. 28	2	0	1
	undet. larva sp. 29	0	0	2
	undet. larva sp. 30	0	0	2
	undet. larva sp. 31	0	1	0
	undet. adult sp. 1	1	0	0
	undet. adult sp. 2	9	0	0
	undet. adult sp. 3	1	1	0
	undet. adult sp. 4	1	0	0
Hymenoptera				
Ceraphronidae	undet. sp. 1	1	0	0
	undet. sp. 2	0	0	1
	undet. sp. 3	0	0	1
	undet. sp. 4	0	0	3
	undet. sp. 5	0	1	0
	undet. sp. 6	0	0	1
Braconidae	undet. sp. 1	1	0	0
	undet. sp. 2	2	0	0
	undet. sp. 3	2	0	0
	undet. sp. 4	1	0	1
	undet. sp. 5	2	0	0

## Appendix 1. Continued.

Order Family	Species	C	P	T
	undet. sp. 6	2	0	0
	undet. sp. 7	0	1	0
	undet. sp. 8	0	0	1
	undet. sp. 9	1	0	0
	undet. sp. 10	0	0	1
	undet. sp. 11	0	0	1
	undet. sp. 12	0	0	1
	undet. sp. 13	8	0	0
Ichneumonidae	undet. sp. 1	0	0	3
	undet. sp. 2	0	0	1
	undet. sp. 3	0	1	0
	undet. sp. 4	0	0	1
	undet. sp. 5	0	0	1
	undet. sp. 6	1	0	0
	undet. sp. 7	0	1	0
	undet. sp. 8	2	0	0
Mymaridae	Gonatocerinae sp. 1	2	0	0
	Gonatocerinae sp. 2	0	1	0
	Gonatocerinae sp. 3	0	1	0
	Gonatocerinae sp. 4	0	0	1
	Gonatocerinae sp. 5	1	0	0
	Gonatocerinae sp. 6	1	0	0
	Mymarinae sp. 1	7	3	1
	Mymarinae sp. 2	1	0	1
	Mymarinae sp. 3	5	1	2
	Mymarinae sp. 4	4	0	0
	Mymarinae sp. 5	0	1	0
	Mymarinae sp. 6	0	0	1
	Mymarinae sp. 7	1	0	0
	undet. sp. 3	4	0	1
Trichogrammatidae	undet. sp. 1	1	0	0
	undet. sp. 2	0	0	1
Eulophidae	Tetrastichinae sp. 1	1	2	4
	Tetrastichinae sp. 2	3	4	3
	Tetrastichinae sp. 3	1	0	1
	Tetrastichinae sp. 4	2	1	2
	Tetrastichinae sp. 5	1	0	0
	Tetrastichinae sp. 6	1	0	0
	Tetrastichinae sp. 7	0	1	0
	Tetrastichinae sp. 8	0	0	1
	Tetrastichinae sp. 9	1	0	0
	Tetrastichinae sp. 10	0	1	0
	Tetrastichinae sp. 11	1	0	0
	undet. sp. 1	3	0	0
	undet. sp. 2	5	0	0
	undet. sp. 3	8	0	0
	undet. sp. 4	5	0	0
	undet. sp. 5	0	1	1
	undet. sp. 6	4	0	0
	undet. sp. 7	0	2	0
	undet. sp. 8	1	0	0
	undet. sp. 9	0	2	5
	undet. sp. 10	0	0	3

## Appendix 1. Continued.

Order Family	Species	C	P	T
	undet. sp. 11	0	0	2
	undet. sp. 12	0	0	1
	undet. sp. 13	0	0	1
	undet. sp. 14	0	1	0
	undet. sp. 15	0	0	1
	undet. sp. 16	1	0	0
	undet. sp. 17	0	0	1
	undet. sp. 18	3	0	0
Elasmidae	undet. sp. 1	1	0	0
	undet. sp. 2	1	0	0
Aphelinidae	undet. sp. 1	2	4	1
	undet. sp. 2	2	0	5
	undet. sp. 3	0	0	1
	undet. sp. 4	0	1	0
	undet. sp. 5	0	0	1
	undet. sp. 6	1	0	0
Signiphoridae	undet. sp. 1	0	1	1
	undet. sp. 2	1	0	0
	undet. sp. 3	0	1	0
Encyrtidae	undet. sp. 1	4	1	1
	undet. sp. 2	0	0	4
	undet. sp. 3	2	0	0
	undet. sp. 4	2	0	3
	undet. sp. 5	4	0	0
	undet. sp. 6	2	0	2
	undet. sp. 7	2	0	1
	undet. sp. 8	2	0	2
	undet. sp. 9	1	1	0
	undet. sp. 10	1	0	0
	undet. sp. 11	1	1	0
	undet. sp. 12	1	1	0
	undet. sp. 13	1	0	1
	undet. sp. 14	1	0	0
	undet. sp. 15	1	0	0
	undet. sp. 16	1	0	0
	undet. sp. 17	1	0	0
	undet. sp. 18	1	0	0
	undet. sp. 19	0	1	0
	undet. sp. 20	2	0	0
	undet. sp. 21	1	0	0
	undet. sp. 22	1	0	0
	undet. sp. 23	0	1	0
	undet. sp. 24	1	0	0
	undet. sp. 25	1	0	0
	undet. sp. 26	0	0	1
	undet. sp. 27	1	0	0
	undet. sp. 28	0	1	0
	undet. sp. 29	1	0	0
	undet. sp. 30	1	0	0
	undet. sp. 31	1	0	0
Eupelmidae	Eupelminae sp. 0	0	0	1
	Eupelminae sp. 1	0	1	0
	Eupelminae sp. 2	4	0	0

## Appendix 1. Continued.

Order Family	Species	C	P	T
	Eupelminae sp. 3	2	0	0
	Eupelminae sp. 4	3	0	0
	Eupelminae sp. 5	7	0	0
	Eupelminae sp. 6	3	0	0
	Eupelminae sp. 7	1	0	0
	Calosotinae sp. 1	2	0	0
	Calosotinae sp. 2	1	0	0
Torymidae	Toryminae sp. 1	3	0	0
	Toryminae sp. 2	1	0	0
	Toryminae sp. 3	1	0	0
	undet. sp. 1	6	0	1
Pteromalidae	Brachyscelidiphaginae sp.	43	0	0
	Eunotinae sp.	3	0	0
	undet. sp. 1	12	0	0
	undet. sp. 3	7	0	0
	undet. sp. 4	22	0	0
	undet. sp. 5	8	0	0
	undet. sp. 6	14	0	0
	undet. sp. 7	6	0	0
	undet. sp. 8	5	0	0
	undet. sp. 9	3	0	0
	undet. sp. 10	5	0	0
	undet. sp. 11	1	0	1
	undet. sp. 13	1	1	1
	undet. sp. 14	2	0	0
	undet. sp. 15	0	1	0
	undet. sp. 16	0	1	0
	undet. sp. 17	1	1	0
	undet. sp. 18	1	0	1
	undet. sp. 19	1	0	1
	undet. sp. 20	0	1	1
	undet. sp. 21	2	0	0
	undet. sp. 22	1	0	0
	undet. sp. 23	0	0	1
	undet. sp. 24	0	0	1
	undet. sp. 27	1	0	0
	undet. sp. 28	1	0	0
	undet. sp. 29	0	1	0
Eurytomidae	Eurytominae sp. 1	1	0	0
	Eurytominae sp. 2	0	1	0
	Harmolitinae sp.	1	0	0
Chalcididae	Brachymeriinae sp.	0	1	0
Cynipidae	undet. sp. 1	2	7	1
	undet. sp. 2	0	1	1
	undet. sp. 3	1	0	2
	undet. sp. 4	0	1	0
	undet. sp. 5	0	0	1
	undet. sp. 6	0	1	0
Diapriidae	undet. sp. 1	1	0	1
	undet. sp. 2	0	0	1
	undet. sp. 3	0	0	1
Scelionidae	undet. sp. 1	1	0	0
	undet. sp. 2	0	0	1

## Appendix 1. Continued.

Order Family	Species	C	P	T
Platygastridae	undet. sp. 1	197	2	1
	undet. sp. 2	3	6	3
	undet. sp. 3	0	1	4
	undet. sp. 4	30	2	1
	undet. sp. 5	1	0	1
	undet. sp. 6	0	1	1
	undet. sp. 7	0	0	1
	undet. sp. 8	1	0	0
	undet. sp. 9	0	1	0
	undet. sp. 10	0	1	0
	undet. sp. 11	0	0	4
Bethylidae	undet. sp. 1	0	3	0
	undet. sp. 2	1	3	0
	undet. sp. 3	1	0	0
Halictidae	undet. sp. 1	0	0	1
Tiphiidae	undet. sp. 1	0	1	0
Formicidae	<i>Camponotus hyatti</i> Emery	15	1	8
	<i>Camponotus vicinus</i> Mayr	14	0	0
	<i>Camponotus</i> sp. 3	0	1	0
	<i>Camponotus</i> sp. 4	0	0	1
	<i>Camponotus</i> sp. 5	0	0	1
	<i>Camponotus</i> sp. 6	1	0	0
	<i>Camponotus</i> sp. 7	1	0	0
	<i>Crematogaster coarctata</i> Mayr	236	16	33
	<i>Formica moki</i> Wheeler	46	2	2
	<i>Formica</i> sp. 2	2	4	8
	<i>Formica</i> sp. 3	112	0	0
	<i>Formica</i> sp. 4	2	0	0
	<i>Formica</i> sp. 5	1	0	0
	<i>Formica</i> sp. 6	1	0	0
	<i>Formica</i> sp. 7	0	0	1
	<i>Formica</i> sp. 8	1	0	0
	<i>Formica</i> sp. 9	0	3	0
	<i>Leptothorax gallae</i> M. Smith	1	3	1
	<i>Leptothorax</i> sp. 1	0	3	1
	<i>Leptothorax</i> sp. 2	0	2	1
	<i>Leptothorax</i> sp. 3	0	1	0
	<i>Leptothorax</i> sp. 4	1	0	0
	<i>Leptothorax</i> sp. 5	1	0	0
	<i>Linepithema humile</i> (Mayr)	1738	21	98
	<i>Monomorium ergatogyna</i> Wheeler	77	6	0
	<i>Monomorium</i> sp. 2	0	0	1
	<i>Prenolepis imparis</i> (Say)	132	156	185
	<i>Tapinoma sessile</i> (Say)	131	25	2
	undet. sp. 29	0	0	2
	undet. sp. 30	0	1	0
	undet. sp. 31	0	0	1
	undet. sp. 32	0	0	1
Undetermined	undet. sawfly larva sp. 1	1	1	1
	undet. sawfly larva sp. 2	0	1	0
	undet. chalcidoid sp. 1	1	0	0
	undet. chalcidoid sp. 2	0	0	1

## Appendix 1. Continued.

Order Family	Species	C	P	T
	undet. chalcidoid sp. 3	1	0	0
	undet. chalcidoid sp. 4	0	0	3
	undet. wasp sp. 1	1	0	0
	undet. wasp sp. 2	1	0	0